

Trails	<ul style="list-style-type: none"> ▪ Designated trails only. Close redundant trails; trails where resource damage cannot be mitigated; and trails where closure is needed to limit encounters. ▪ Rerouting may be necessary to correct existing problems on designated trails. ▪ Designated portage trails may be necessary to protect/avoid unacceptable impacts to resources.
Woody Debris	<ul style="list-style-type: none"> ▪ No large woody debris removal without agency approval. No large woody debris removal to accommodate recreation within the river or stream banks on the upper Chattooga River.
Dispersed Camping	<ul style="list-style-type: none"> ▪ Camping only in designated sites. ▪ Campsites limited to no more than three tents, except for group-designated campsites. ▪ Designated fire ring locations. ▪ Permanently close and rehabilitate excessive and unsustainable campsites.
Parking	<ul style="list-style-type: none"> ▪ Close roadside parking within ¼ mile of Burrells Ford Bridge. ▪ Lost parking spaces would not be replaced. ▪ No net gain in parking capacity.
User Registration	<ul style="list-style-type: none"> ▪ Safety equipment for boaters would be determined at the district level and would be a condition of the self-registration permit. ▪ Manage encounters using adaptive management strategy that may include user registration, monitoring, surveys, etc., followed by indirect and direct measures.
Monitoring	<ul style="list-style-type: none"> ▪ Periodically assess amount of use/encounters occurring more than ¼ mile from roads and bridges. ▪ Periodically assess the condition of LWD. ▪ Periodically assess need for designation of portage areas/trails to ensure rare plants are not adversely impacted (see Appendix B). ▪ If encounters are exceeded on more than 20% of days per year for two consecutive years, the agency would implement indirect measures such as reducing group size, educating the public about alternative recreation opportunities, changing access areas and/or changing camping opportunities. Then, after two full years of implementing indirect measures, if encounters are exceeded in the third year, a permit system would be implemented for all users to manage level of encounters.

2.2 Alternatives Considered But Not Evaluated In Detail

Boating in the Tributaries above Highway 28

Under current management, boating is not allowed on the main stem or in the tributaries of the Chattooga River above the Highway 28 bridge. Per the Wild and Scenic Rivers Act, both the main stem of the river and the corridor (1/4 mile on each side of the main stem) are designated as “wild and scenic.” As a result, because boating is not currently permitted on the main stem, it also is not permitted on the tributaries. While developing alternatives that permit boating above Highway 28, the agency considered extending boating opportunities to the tributaries. However, because of concerns regarding large woody debris, native brook trout restoration, vegetation removal, increased encounter levels, user-created trails, as well as enforcement and management issues, the agency determined that the analysis of boating in the tributaries in further detail was unnecessary.

Of particular concern is the brook trout, the only salmonid native to the Southern Appalachian Mountains. The South Carolina Department of Natural Resources (SCDNR) has documented the complete loss of some brook trout populations and significant loss of range in recent years. Recent survey data and historical records indicate that in South Carolina, brook trout range has also declined at least 70 percent. Remnant populations are found in only six streams on the Andrew Pickens Ranger District. To improve habitat conditions favorable for the preservation and perpetuation of native brook trout, the Forest Service and SCDNR are actively restoring stream habitat in the Chattooga River watershed through the addition of LWD. LWD is an important component of the aquatic ecosystem. It provides habitat diversity for aquatic species by increasing pool habitats and providing

cover and refuge. It also provides a substrate for macroinvertebrates and nutrients to the stream system. In the area above Burrells Ford, emphasis is being placed on maintaining or enhancing existing populations of brook trout.

Preliminary Alternatives 2, 3, 4 and 5:

Some components of these preliminary alternatives were modified in direct response to comments received during scoping. The actions for campsites, trails, LWD and management of encounters changed slightly or were clarified for these alternatives as they appear in Section 2.1.

Preliminary Alternative 6:

This alternative was eliminated from detailed consideration because Alternative 8 was developed as a replacement. Alternative 6 provided the most boating opportunities of the preliminary alternatives. Alternative 8 was developed as a substitute to better reflect the desires of the boating community.

Preliminary Alternative 7:

Preliminary Alternative 7 was presented at the September 29, 2007 public meeting for review and comment. Some components of this alternative were rolled into alternatives 4 and 5; Alternative 7, therefore, became redundant and unnecessary.

2.3 Comparison of the Alternatives Considered in Detail

Figures 2.3-1 through 2.3-5 are graphic representations of the upper Chattooga areas open to boating in alternatives 4, 5, 8, 9 and 10, along with a synopsis of boating conditions. Table 2.3 displays the alternatives in a comparison chart.

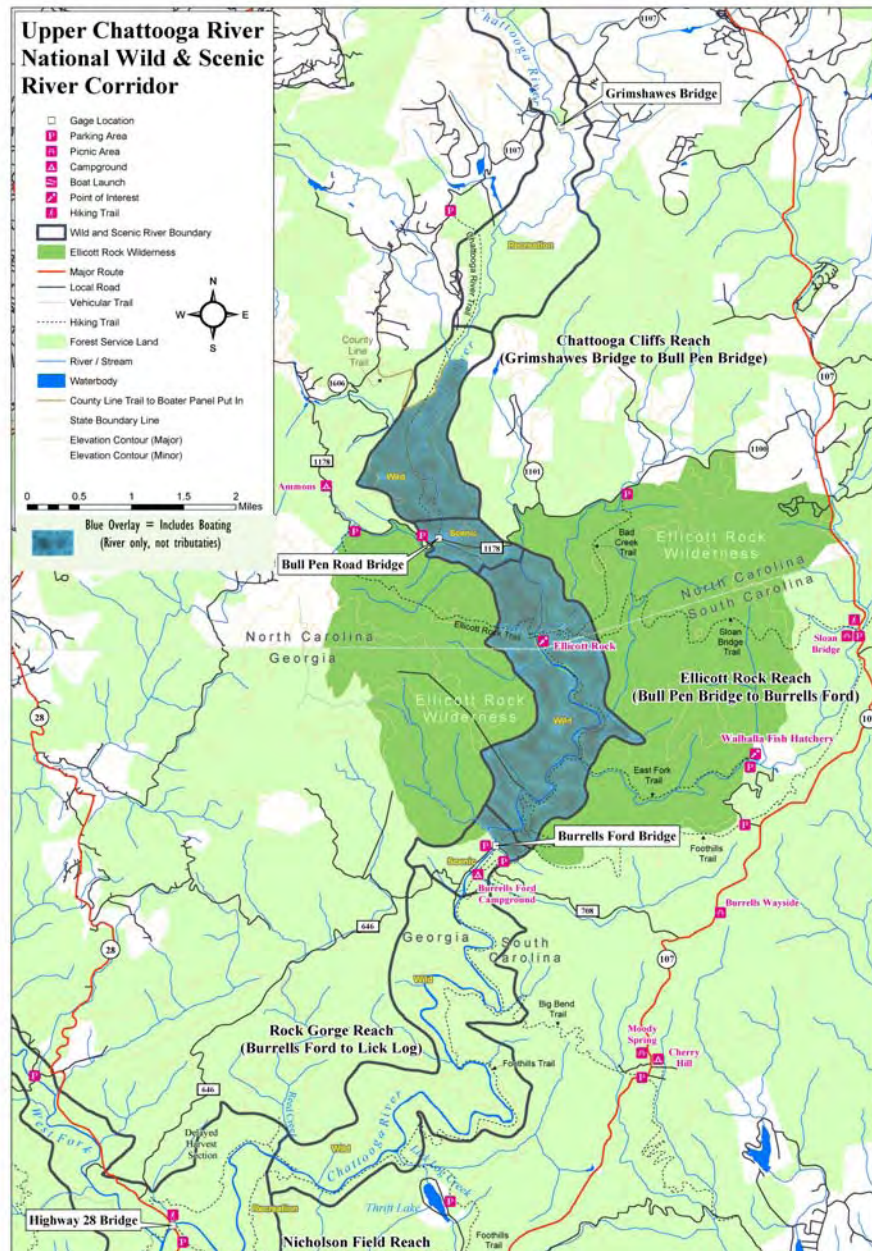


Figure 2.3-1 Alternative 4

ZONES: Confluence of Norton Mill Creek south to Bull Pen Bridge; Bull Pen Bridge south to Burrells Ford Bridge [± 7 miles].

SEASON: December 1-March 1.

FLOW: Flow levels of approximately 450 cfs at Burrells Ford gauge.

TYPE OF CRAFT: Single/tandem hardboats and inflatable kayaks.

[Boatable Days in an Average Year: 6; range 0 to 11 (Hansen 2007)]

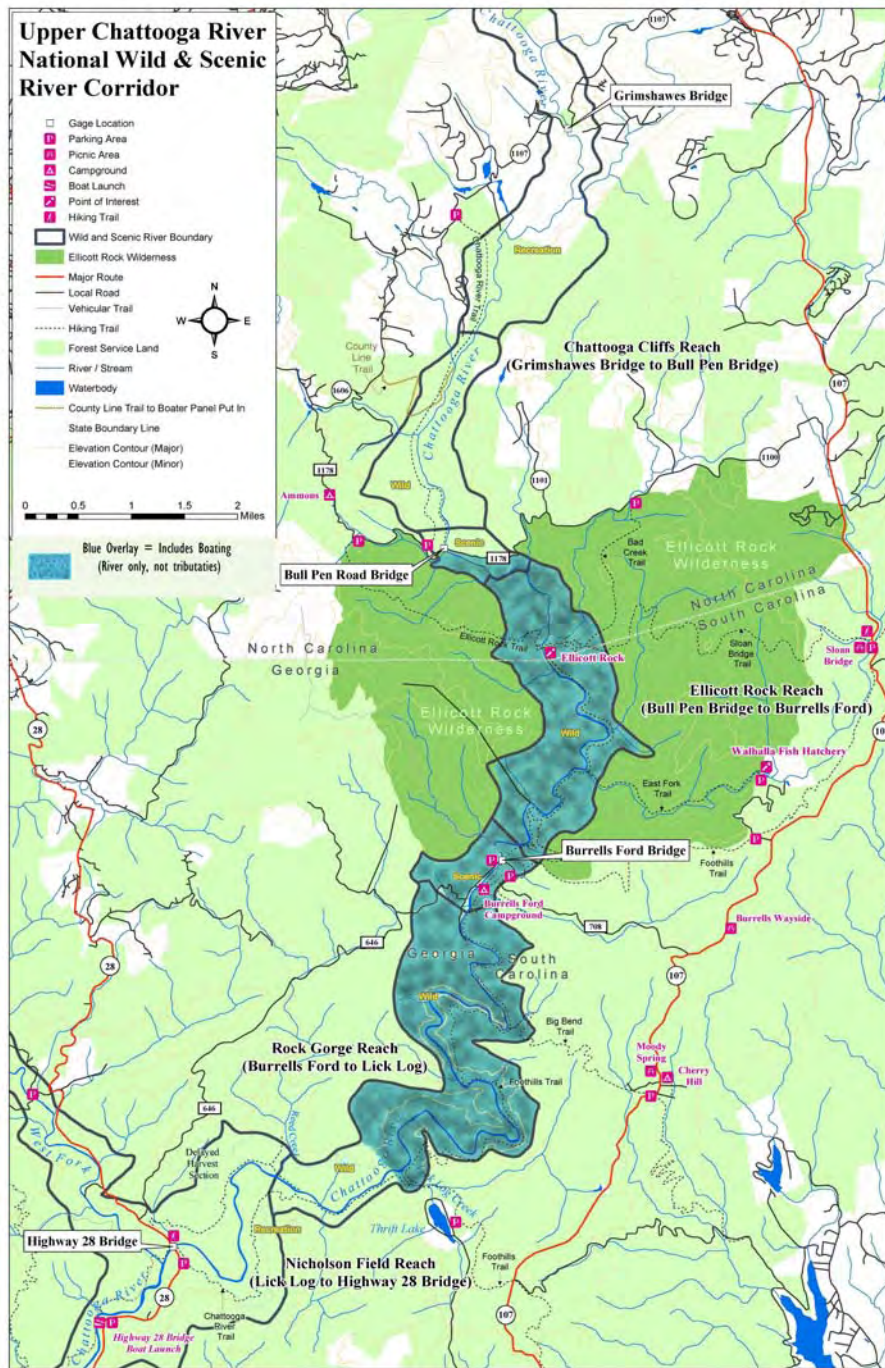


Figure 2.3-2 Alternative 5

ZONES: Bull Pen Bridge to Burrells Ford; Burrells Ford to Lick Log Creek [+/- 13 miles].

SEASON: All year.

FLOW: Flow levels of approximately 350 cfs Burrells Ford gauge.

TYPE OF CRAFT: Single/tandem hardboats and inflatable kayaks.

[Boatable Days in an Average Year: 37; range 12 to 64 (Hansen 2007)]

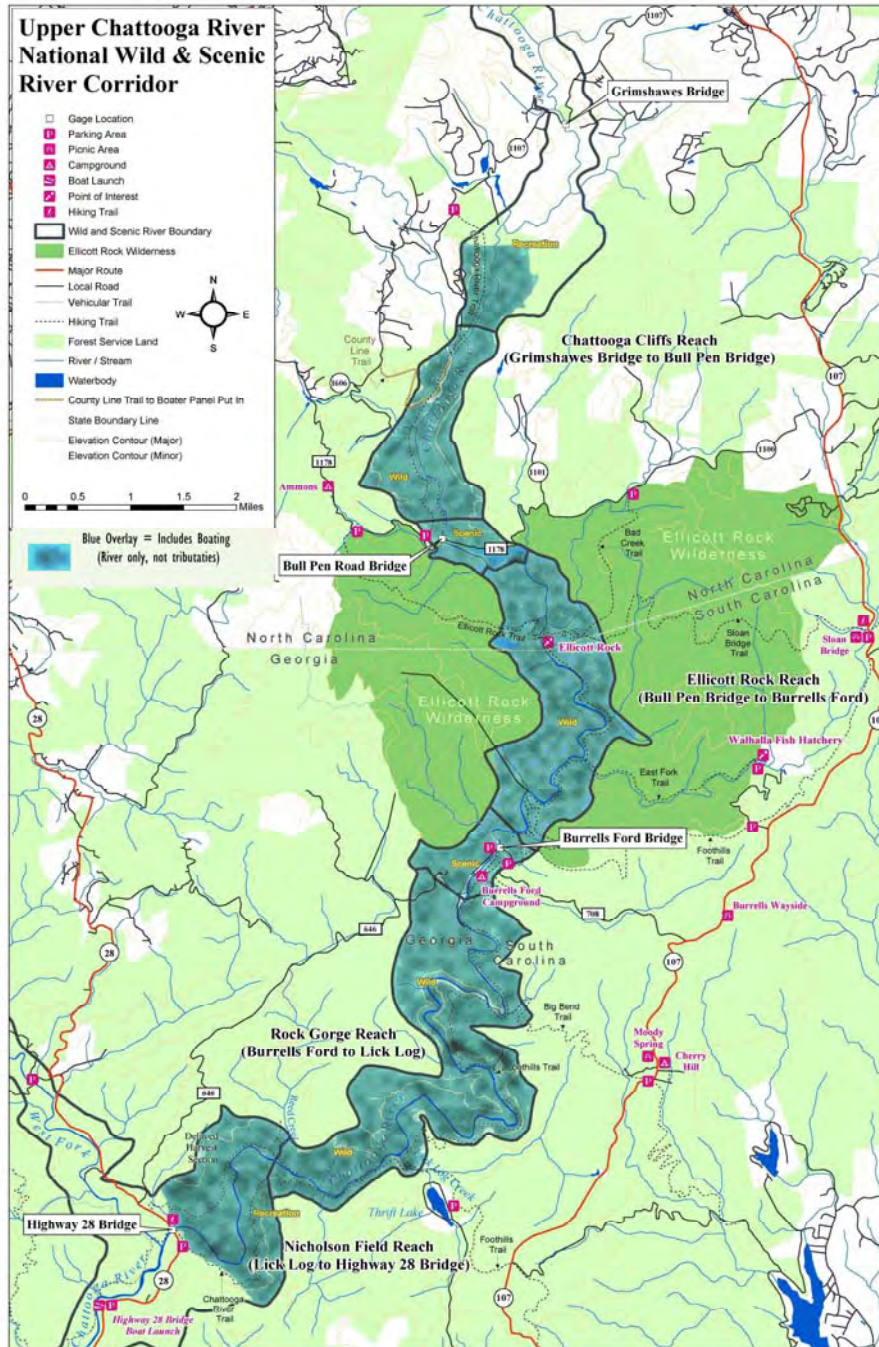


Figure 2.3-3 Alternative 8

ZONE: 4/10 mile below private property to Highway 28 bridge [± 20 miles].

SEASON: All year.

FLOW: All flow levels.

TYPE OF CRAFT: Single/tandem hardboats and inflatable kayaks, up to four-person rafts
[Boatable Days in an Average Year: 125; range 85 to 168 (Hansen 2007)]

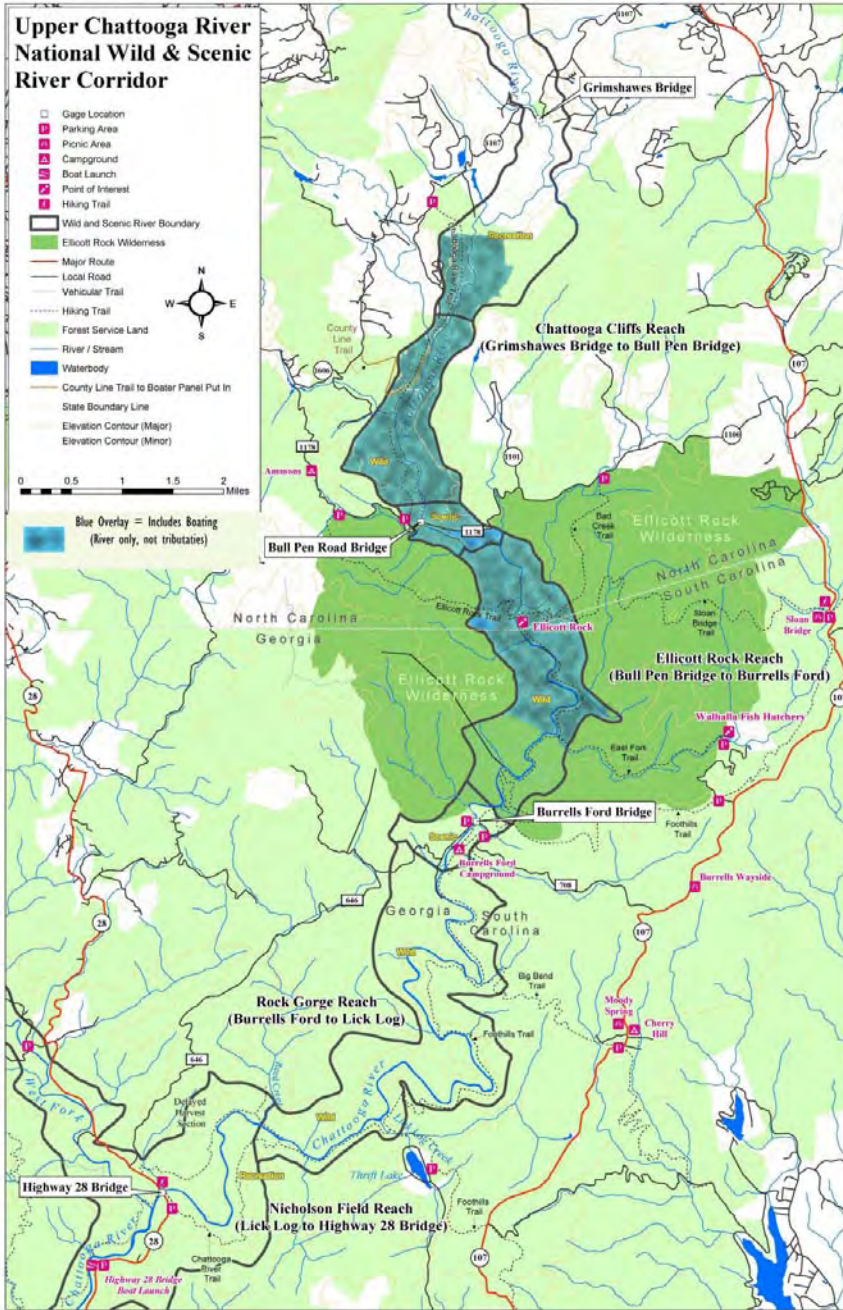


Figure 2.3-4 Alternative 9

ZONE: 4/10 mile below private property to East Fork Trail [+/- 6 miles].

SEASON: November 1 - March 31.

FLOW: Flow levels of approximately 350 cfs at Burrells Ford gauge.

TYPE OF CRAFT: Single/tandem hardboats.

[Boatable Days in an Average Year: 21; range 4 to 38 (Hansen 2007)]

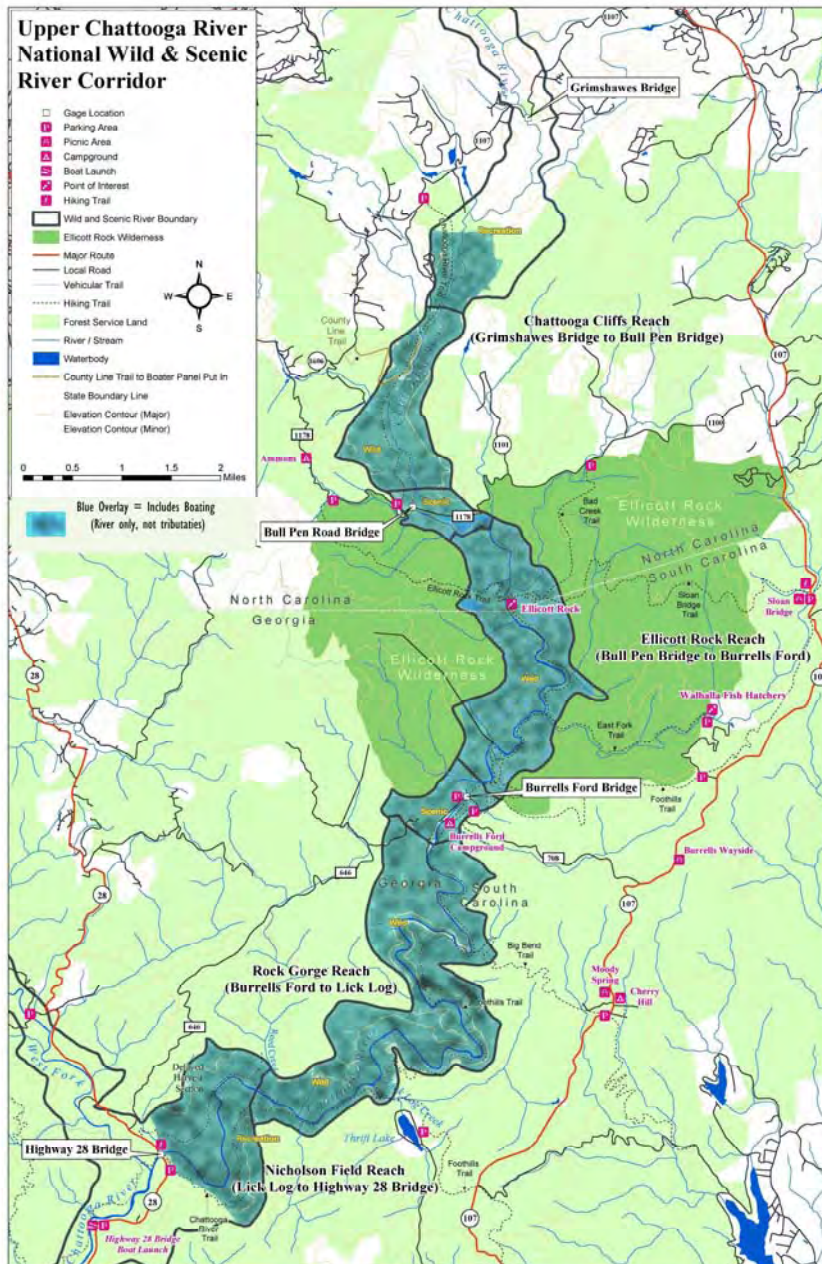


Figure 2.3-5 Alternative 10

ZONE: 4/10 mile below private property to Highway 28 bridge [+/- 20 miles].

SEASON: November 1 - March 1.

FLOW: Flow levels of approximately 350 cfs at Burrells Ford gauge.

TYPE OF CRAFT: Tandem/single-capacity hard boats/inflatable kayaks from below private land to Lick Log Creek; single/tandem hardboats and inflatables Lick Log Creek to Highway 28 bridge.

[Boatable Days in an Average Year: 14; range 0 to 28 (Hansen 2007)]

Table 2.3-1 Comparison Of Alternative Components

BP = Bull Pen Bridge; BF = Burrells Ford Bridge; RC= Reed Creek; 28 = Highway 28 bridge; NMC = confluence of Norton Mill Creek; CRT = Chattooga River Trail; EF = East Fork; BFPL = Burrells Ford Parking Lot; FT = Fisherman's Trail/Big Bend Road; LLC = Lick Log Creek

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Description	Current Management	This alternative emphasizes increased solitude by managing encounters through a permit system and by reducing user-created features (ie. campsites and trails).	This alternative emphasizes year-round, high-quality trout fishing and maintaining current encounter levels.	This alternative emphasizes year-round, high-quality trout fishing and at the same time provides boating opportunities on the main stem upper Chattooga. It maintains current encounter levels.
BOATING				
Zone				NMC – BF
Single/Tandem-capacity hardboats & inflatable kayaks				Yes
Up-to-four person rafts				
Season				Dec. 1 – March 1
Flow level				Flows of approx. 450 cfs
Designated put-ins				NMC; BP
Designated take-outs				BP; BF
Days/year				Avg. 6; low 0; high 11
ENCOUNTERS		≤ 3 BP - RC ≤ 6 RC - 28	Trails	Same as 3.
			AreaWeekendsWeekdays	
			Above BP≤ 4≤ 4	
			BP-BF≤ 9≤ 4	
			BF-28≤ 15≤ 8	
			In River	
			AreaWeekendsWeekdays	
			Above BP≤ 4≤ 4	
			BP-RC≤ 6≤ 6	
			RC-28≤ 8≤ 8	
[exceptions w/in ¼ mile of all roads bridges and BF Campground]				
GROUP SIZE		12 trails 6 camping 4 anglers	Same as Alternative 2	Existing users same as Alternative 2; six boaters (min. 2 craft per group)
WOODY DEBRIS		Maintain current management.	Same as Alternative 2	No LWD removal without agency approval. No LWD removal to accommodate recreation within the river or stream banks on the upper Chattooga River
TRAILS		No new except for solitude. Reroute ok.	Expect reroutes & possible closures	Expect reroutes, portage, and possible closures
DISPERSED CAMPING		Designated sites/fire rings; 1 site per 1/4 mile. No more than 3 tents except in group-designated sites. Close/rehab excessive/unsustainable sites. Reservation required	Designated sites/fire rings; No more than 3 tents except in group-designated sites. Close/rehabilitate excessive/unsustainable campsites.	Same as Alternative 3
PARKING		No roadside parking within ¼ mile of BF; Lost parking not replaced; No net gain.	Same as Alternative 2	No change from current forest plan directions.
REGISTRATION /PERMITS		Self-registration /permits	Adaptive management	Adaptive management/ boaters register/boaters safety equipment

Table 2.3-1 Continued

	Alternative 5	Alternative 8	Alternative 9	Alternative 10
Description	This alternative emphasizes year-round, high-quality trout fishing and at the same time provides more boating opportunities on the main stem upper Chattooga. Boating would be excluded from the Chattooga Cliffs reach and the delayed-harvest area in order to address a combination of biological and social concerns.	This alternative emphasizes boating opportunities with no zone, season or flow restrictions on the upper stem of the Chattooga River while still providing quality trout fishing.	This alternative emphasizes boating with season and flow restrictions in the stretch of the main stem upper Chattooga most highly rated for creek boating while still providing high-quality trout fishing.	This alternative emphasizes boating with season and flow restrictions on the main stem of the upper Chattooga River while providing high-quality trout fishing.
BOATING				
<i>Zone</i>	BP to LL	CRT to 28	CRT to EFT	CRT to 28
<i>Single/Tandem-capacity hardboats & inflatable kayaks</i>	Yes	Yes	Yes	Yes
<i>Up-to-four person rafts</i>		Yes		
<i>Season</i>	Year-round	Year-round	Nov. 1 – March 31	Nov. 1 – March 1
<i>Flow level</i>	Flows approx. 350 cfs		Flows approx. 350 cfs	Flows approx. 350 cfs
<i>Designated put-ins</i>	BP; BFPL	CRT; NMC; BP; BFPL; FT; LLC	CRT; NMC; BP	CRT; NMC; BP; BFPL; FT; LLC
<i>Designated take-outs</i>	BF; LLC; FT	NMC; BP; BFPL; FT; LLC; 28	NMC; BP; EFT	NMC; BP; BFPL; FT; LLC; 28
<i>Days/year</i>	Avg. 37; low 12; high 64	Avg. 125; low 85; high 168	Avg. 21; low 4; high 38	Avg. 14; low 0; high 28
ENCOUNTERS	Same as Alternative 3	Trails: ≤ 6 in upper corridor In-River: ≤ 4 above BP ≤ 6 BP-RC ≤ 8 RC-28 [exceptions w/in ¼ mile of all roads/bridges and BF Campground]	Same as Alternative 8	Same as Alternative 8
GROUP SIZE	Same as Alternative 4	6 all users; minimum of 2 craft per group of boaters	Same as Alternative 4	Same as Alternative 4
WOODY DEBRIS	Same as Alternative 4	Same as Alternative 4	Same as Alternative 4	Same as Alternative 4
TRAILS	Same as Alternative 4	Same as Alternative 4	Same as Alternative 4	Same as Alternative 4
DISPERSED CAMPING	Same as Alternative 3	Same as Alternative 3	Same as Alternative 3	Same as Alternative 3
PARKING	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2
REGISTRATION/PERMITS	Same as Alternative 4	Same as Alternative 4	Same as Alternative 4	Same as Alternative 4

SECTION 3.1 PHYSICAL RESOURCES
Section 3.1.1 Water and Riparian Corridor

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 PHYSICAL RESOURCES

3.1.1 Water and Riparian Corridor

SUMMARY OF FINDINGS

Sediment is the primary pollutant of concern in the Chattooga watershed. Unpaved dirt and gravel roads are the main contributors to stream sedimentation in the Chattooga River, however, some trails and campsites may also be sediment sources. While recreation management proposed in the alternatives would likely result in an overall reduction in sedimentation from existing trails and campsites, increasing use, including the addition of boaters in some alternatives, would likely result in some new potential sediment sources from user-created trails. Overall, the impact is not likely to be great from any of the alternatives; however the potential impact does vary by alternative. Alternative 2 would likely result in the greatest reduction in impacts. Alternative 8 has the most potential for increased impacts. None of the alternatives are likely to create unacceptable cumulative increases in sediment across the Chattooga watershed.

AFFECTED ENVIRONMENT

The Chattooga River watershed is located in the Southern Blue Ridge Ecological Province. Streams and rivers in the Southern Blue Ridge tend to be entrenched step/pool or pool/riffle systems with boulder and cobble substrate in riffles, and sand in pools. The wild and scenic river corridor is situated mostly within the Chattooga River Gorge. Topography and landforms in the gorge include steep gorge walls, alluvial terraces, hillside ravines, low ridges and bouldery river/waterfalls. The geology features weathered parent material, sensitive to disturbance and susceptible to erosion. When exposed to the elements, disturbed areas can become chronic sediment sources.

The upper Chattooga River corridor is divided into four segments for analysis and reporting purposes. References to these segments (reaches) are made throughout this EA. Table 3.1-1 identifies the segments.

Table 3.1-1. Chattooga River Segments (Source: Whittaker and Shelby 2007)

Reach Name	Location	River miles
Chattooga Cliffs	Grimshawes Bridge to Bull Pen Bridge	5.3
Ellicott Rock	Bull Pen Bridge to Burrells Ford Bridge	5.4
Rock Gorge	Burrells Ford Bridge to Lick Log Creek	7.3
Nicholson Fields	Lick Log Creek to Hwy 28 Bridge	3.8
Total		21.8

Section 3.1.1 Water and Riparian Corridor

Water Resources

The following table displays total miles of stream, summarized by order, for both the entire Chattooga River watershed and the upper Chattooga corridor area.

Stream Order	Watershed Miles	Upper Chattooga Corridor Miles
1	1814	75
2	642	24
3	299	7
4	156	3
5	94	2
6	54	22
7	29	0

The stream types for the watershed include approximately 28 percent perennial, 17 percent intermittent and 55 percent ephemeral streams (Hansen 2001). Most of the measured perennial and intermittent streams were entrenched to moderately entrenched, with low to high width to depth ratios.

Riparian Resources

Most riparian areas in the river corridor are in the 100-year floodplain. The soils are predominantly well-drained alluvial deposits formed when sediment settles out from flowing water during flood events. Such soils are sensitive to ground disturbing activities, including dispersed recreation. Most recreational access to the river is through the riparian corridor and erosion and compaction impacts have been the result. Few, if any, wetland areas exist in the Chattooga riparian corridor.

Water Quality

The Chattooga River and its tributaries have various classifications developed by each state water quality agency, in addition to the federally designated wild and scenic river status. In North Carolina, the Chattooga River from its source to the state line is classified as a Class B, trout water and outstanding resource water (ORW). In Georgia, the Chattooga River from the Georgia-North Carolina state line to the Tugaloo Reservoir is classified as wild and scenic. The Chattooga River and all its tributaries are also classified as primary trout waters in Georgia. In South Carolina, the Chattooga River from the North Carolina state line to its confluence with Opossum Creek is classified as outstanding resource waters. Beneficial uses for the Chattooga River include primary recreation (swimming on a frequent or organized basis), fishing, aquatic life including natural trout propagation and survival of stocked trout, and wildlife.

Sediment is the primary pollutant of concern in forested watersheds in the Southeast (Coats and Miller 1981). Excess fine sediment in stream systems fills interstitial space between larger rocks and reduces the amount of available fish and macroinvertebrate habitat. Many of the streams on the Chattooga River watershed have excess stored sediment from past land management activities in addition to the high erosive potential of micaceous and alluvial soils in the region.

Unpaved dirt and gravel roads are the primary contributors to stream sedimentation in the Chattooga River watershed. Another source of sediment comes from recreation sites and user-created recreation areas. Managing recreation impacts can reduce sedimentation and improve

Section 3.1.1 Water and Riparian Corridor

overall water quality. Recreation uses have increased since 1995; therefore, recreation impacts from existing users to water quality in the Chattooga watershed are likely higher today. Managing impacts from these uses can improve water quality in the Chattooga watershed.

Under the Clean Water Act, if a stream does not have high enough water quality to meet its designated beneficial uses, it is listed as either “partially supporting” or “not supporting” based on the presence of certain pollutants. Streams that are not supporting or partially supporting their designated beneficial uses are added to the 303d list of impaired streams. As part of the Georgia TMDL (Total Maximum Daily Load) settlement agreement, the U.S. Environmental Protection Agency (EPA) conducted an assessment of water quality conditions for streams in the Chattooga watershed from 1997 - 1999. Results of the assessment were used to determine if any stream reaches in Georgia were impaired due to sediment concerns. Stream reaches in South Carolina and North Carolina were also sampled and results were forwarded to the appropriate state water quality agency for further action.

Stream reaches of concern that are located at least in part in the upper Chattooga corridor are East Fork, Norton Mill Creek, Fowler Creek and Ammons Branch. Table 3.1-2 describes the beneficial use status and pollutants of concern for these stream reaches.

Table 3.1-2. Upper Chattooga Stream Reaches Of Concern

State	Stream	Use Support Status	Pollutant of Concern
South Carolina			
	East Fork Chattooga River (downstream of fish hatchery)	Partial support	Unknown
North Carolina			
	Norton Mill Creek (already 303d listed)	Partial support	Unknown
	Fowler Creek (downstream of Cashiers)	Not supporting	Excessive sedimentation
	Ammons Branch	Full support-watch list	Increased sediment

Source: US EPA, 1999.

Chattooga River Flows

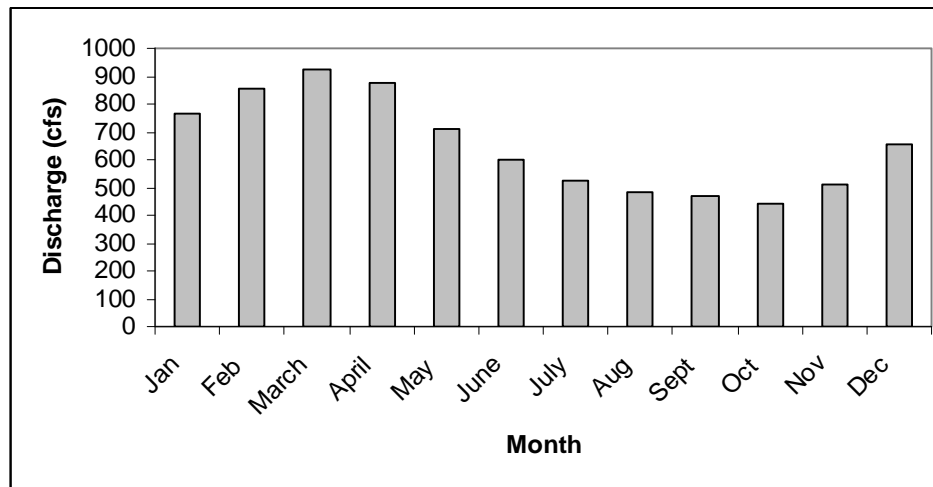
Average annual precipitation in the Chattooga watershed is 70 - 80 inches; mean water yield is about 40 – 45 inches. Figure 3.1-1 shows the mean monthly discharge (period of record from 1940-2006) at the United States Geological Survey (USGS) gauge station (USGS 02177000) on the Chattooga at Highway 76. Monthly streamflow is fairly constant throughout the year with the highest flows occurring December - April and lowest August - October. In a normal year, this region receives considerable rainfall, often in short, heavy thunder or tropical storms that produce flashy flows in the summer and early fall, and larger scale storms driven by frontal low movements in the winter months. The higher monthly flows are in the dormant season¹, and the decline from April - October is linked to vegetation growth and its impact on moisture stress and water table depth.

¹ The dormant season is the time in which there are minimal rates of evapotranspiration from vegetation, soils and other surfaces. This is typically the winter season.

Section 3.1.1 Water and Riparian Corridor

The long-term data at Highway 76 was used as an indicator of boating frequency for planning purposes. The correlation data involve comparisons of flow between two stream stations (Highway 76 and Burrells Ford) within the same watershed. Generally there is a good relationship between the flows except during storms events. The report highlights the limitations of using Highway 76 as a sole predictor for flow in the North Fork. A new gauge at Burrells Ford would be used to help the Forest Service to declare a boatable day (see Appendix C).

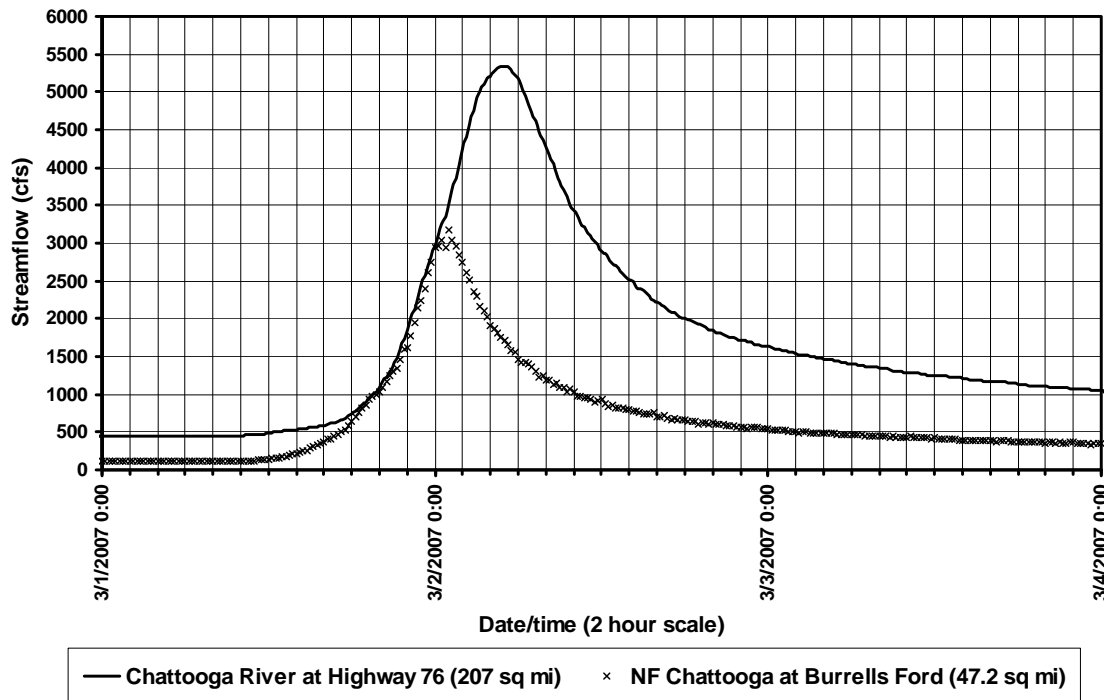
Figure 3.1-1. Mean Monthly Flow (cfs) For The Chattooga River At Highway 76.



A permanent water level recorder was installed in June 2006 on the upper Chattooga at the Burrells Ford Bridge. Correlations between the Highway 76 and Burrells Ford gauge show that during non-storm periods the two gauges are moderately to highly correlated. The summary report of the differences in flow between the Chattooga at Highway 76 and the North Fork Chattooga at Burrells Ford can be found in the process records. Figure 3.1-2 displays the hydrograph of a bankfull spring storm on the Chattooga River at Burrells Ford and Highway 76. Bankfull events of this magnitude occur on average, about once every year or two, so they occur with enough frequency to affect channel morphology or structure. More typical storms produce much less flow. Unless exceptionally dry, winter dormant periods need two to three inches of rainfall to achieve flows approximating 450 cfs.

Section 3.1.1 Water and Riparian Corridor

Figure 3.1-2. Hydrograph For A Typical Early Spring Storm At The Chattooga River At Burrells Ford And Highway 76.



The initial rise and fall of the hydrographs for both gauges is similar. The end portion of the falling limb of the hydrograph takes longer to even out than the rising limb. This dormant season bankfull event storm shows the fairly flashy nature of the storms in the upper Chattooga where flows from a single event increase and decrease during a two-three day period. However, it takes longer for the river to return to base flow levels after the initial storm peak. This hydrograph also shows the difference in the timing of storm peaks between the two gauges, with the Highway 76 gauge peaking approximately four hours after the Burrells Ford gauge. However, the timing of flows between the two gauges varies from approximately eight hours at low flows and three hours at very high flows (Hansen 2007).

Hemlock Woolly Adelgid (HWA)

Eastern hemlock (*Tsuga canadensis*) is the one of the primary riparian tree species in the Southern Blue Ridge. The hemlock woolly adelgid (*Adelges tsugae* Annand), a non-native insect, is killing the two Eastern U.S. species of native hemlock: Carolina hemlock (*Tsuga caroliniana* Engelm.) and eastern hemlock (*Tsuga canadensis* (L.) Carr). No effective natural control with native biota or physical environmental factors currently exists. Without active intervention, 90 percent of existing hemlock is forecasted to be dead within five to ten years.

As hemlocks die slowly, they remain standing for several years, but eventually lose their larger branches. When the root-wad is lost, bank stability decreases. Loss of hemlock bank trees due to natural events such as flooding or wind throw may be accelerated by hemlock death. This has the potential to add a substantial amount of LWD to the Chattooga River and tributaries. Understory development and opportunistic expansion from associated vegetation would help to eventually maintain bank stability.

Section 3.1.1 Water and Riparian Corridor

With the loss of hemlock, the species composition and age structure of riparian stands will change. There will be an increased number of canopy gaps and increased light availability to the forest floor. These site changes will influence natural regeneration of the stand over time, as well as LWD stream inputs. Two probable scenarios could occur depending on existing vegetation. In stands where there is a *Rhododrendon* subcanopy, there would be a long-term decrease in transpiration. In stands where black gum and yellow poplar dominate, there would be a short-term increase in transpiration. There may be a greater hydrologic impact in areas currently dominated by hemlock in riparian areas

Recent research from the U.S. Forest Service Southern Research Station suggests that fluctuations in tree water use as a consequence of hemlock death could result in: (1) increased soil moisture; (2) increased discharge; (3) decreased daily amplitude of streamflow; and (4) changes in streamside forest structure (Ford and Vose 2007).

Large Woody Debris

LWD is important to stream ecosystem health from both a biological and physical perspective. It provides habitat for aquatic macroinvertebrates and fishes and increases the amount of nutrients available to aquatic organisms. LWD may also control channel morphology. Often pool frequency and type, as well as the amount of sediment contained within a channel, are a function of the amount of LWD found in the system (Bilby and Ward 1991). In larger, higher order streams such as the Chattooga, LWD tends to be larger and less abundant. Larger streams have wider channels, more stream velocity, and depth to move woody debris, so incorporation of the debris into the channel is often of a shorter duration than in smaller channels unless it is positioned so it can be buried in sediments. However, accumulations of wood in large channels can also reach enormous proportions and have an effect on channel morphology through the alteration of flow patterns (Bilby and Bisson 1998).

Removal of LWD can negatively impact stream channel morphology. Depending on flow levels, the presence of LWD in the channel can create areas of river that require portage. Over time, a route that is consistently trampled by users can also have negative impacts by causing erosion, resulting in sedimentation into the stream channel.

From a physical perspective, the primary effect of LWD removal is the alteration of channel morphology. In general, the effects of LWD removal are site specific and the consequences are highly variable depending on the size of the channel and wood size and placement. In some cases, removal could result in more bank and channel erosion; however, in others, wood removal could increase bank and channel stability.

Since LWD loading and transport is dynamic, and many of the reaches of the upper Chattooga remain unscooped, it is unknown how much wood would ultimately be removed due to the addition of boating. In the expert boating reconnaissance, logs caused three to five portages depending on boater skill level, most of which were in the Chattooga Cliffs reach (Whittaker and Shelby 2007). However, none required portaging outside the stream channel. As hemlock mortality from HWA increases, it is estimated that there will be more loading of LWD of a size that could affect boating access in the upper Chattooga.

Section 3.1.1 Water and Riparian Corridor

In November 2007, Forest Service personnel conducted an inventory of dead and down LWD in the upper Chattooga River, West Fork Chattooga River and two tributaries of the West Fork Chattooga River (Overflow and Holcomb Creeks). Crews counted all wood larger than one meter long and 10 centimeters in diameter that had the potential to influence stream channel shape and function; in practice, this meant all wood that impinged on the bankfull channel. Table 3.1-3 displays results of this recent inventory (Dolloff et al. 2008).

Table 3.1-3. Total LWD Counts From Chattooga Watershed Stream Inventories Conducted In November 2007.

River	Downstream Start Location	Length (miles)	Total LWD	LWD per mile
Chattooga	Confluence with west fork Chattooga	20.4	4171	205
West fork Chattooga	Confluence with main stem Chattooga	6.0	2154	357
Holcomb Creek	Three Forks	2.7	1446	529
Overflow Creek	Three Forks	2.9	551	193

Source: Dolloff et al. 2008

Note: LWD per mile calculated from raw data, which were tallied using 500 meter reaches.

EXISTING IMPACTS TO THE ENVIRONMENT

The spatial bound for direct and indirect effects is $\frac{1}{4}$ mile on either side of the upper Chattooga River and the spatial bound for cumulative effects is the Chattooga River watershed measured at two scales; that portion above Highway 28 and the drainage as measured above Tugaloo Lake. The temporal bound of analysis for cumulative effects analyzes projects and land usage within the watershed that have taken place within the last five years and the foreseeable projects in the next five years.

Estimates of biophysical impacts in the upper Chattooga corridor are based on recent monitoring conducted in 2006-07 (USDA 2007) that included documenting all designated and user-created trails, the amount of litter along trails, the number and condition of campsites (bare ground, cleared area, cut trees and amount of litter), sites with erosion problems and the proportion of trail and camps within 20 feet of the river. The monitoring effort covered National Forest System (NFS) lands in the basin from Grimshawes Bridge to Tugaloo Lake, including the West Fork. This monitoring effort documents baseline information about biophysical impacts.

Increased use by existing users has resulted in an abundance of user-created trails, campsites and stream crossings, especially in areas that are important to a variety of user groups. Current dispersed recreation is problematic because it often occurs in areas that are most sensitive to disturbance. Dispersed recreation is especially detrimental to stream channels when it is located directly on streambanks. Impacts to vegetation in riparian areas can occur even with low to moderate usage levels (Whittaker and Shelby 2007). This user-created disturbance results in banks that are often denuded (stripped) of vegetation and increase the potential for erosion of soil into stream channels.

Sedimentation in stream channels is the primary indirect effect of erosion from dispersed recreation. The primary impact of sedimentation is a loss of quality habitat for aquatic

Section 3.1.1 Water and Riparian Corridor

organisms. Sediment can also increase turbidity, change stream temperature, alter substrate size and distribution, and alter channel morphology.

Campsites

The number and size of user-created campsites is often determined by the amount and kind of dispersed recreation occurring within a specific area. Table 3.1-4 provides information on the number of existing campsites, cleared area and bare ground associated with those campsites. The greater the total bare ground and cleared area, the greater the erosion potential. The Rock Gorge reach has more campsites and associated bare and cleared ground than the other reaches; however, 30 of these sites are in the designated walk-in campground off Burrells Ford Road.

Table 3.1-4. Data On The Size And Number Of Existing Campsites On The Upper Chattooga.

Reach	# of Camps	# of Camps within 20 ft. of the river	# of Camps/River Mile	Total Bare Ground (sq. ft.)	Total Cleared Area (sq. ft.)
Chattooga Cliffs	3	1	0.6	3,500	3,850
Ellicott Rock	40	4	7.5	13,944	60,113
Rock Gorge	*62	15	8.4	46,642	105,309
Nicholson Fields	22	6	5.8	5,076	20,853
Total	127	26	n/a	69,162 (1.6 acres)	190,125 (4.4 acres)

Sources: USDA 2007 and Whittaker and Shelby 2007

*This number includes 30 designated campsites in the Burrells Ford campground.

Designated and User-Created Trails

Designated trails are trails planned and designed to minimize the impacts to soil and water resources by locating them on adequate grades with water diversion structures, proper slopes and stable soils. They are maintained to minimize erosion and off-site soil movement.

User-created trails are created by forest visitors, often during recreational activities such as fishing, camping, hiking or to access certain areas such as boating put-ins or take-outs or other specific points of interest. These trails are often poorly located, within close proximity to streams or streambanks, do not meet trail design specifications/standards, receive no maintenance and do not meet erosion control specifications. User-created trails often lead off a designated trail and go down steep slopes to a major stream or the Chattooga River. Over time, continued use of these user-created trails contributes directly to compacted soils, development of entrenched areas and results in areas of concentrated flow. Direct and indirect effects include erosion with sediment delivery to streams. Designated trails can also cause erosion and sedimentation when they are poorly maintained and receive high use.

Table 3.1-5 displays the number of miles of existing designated and user-created trails in the upper Chattooga corridor. This table also shows the number of erosion problems in each reach and gives standardized figures for the average number of erosion problems per trail and river mile.

Section 3.1.1 Water and Riparian Corridor

Table 3.1-5. Summary Of Existing Trail Information For The Entire Upper Chattooga River Corridor (All Reaches And For A Distance Of ¼ Mile On Both Sides Of The Chattooga River).

Reach	Designated Trail (mi)	User-created Trails (mi)	# of Erosion Points	User-Created Trail Miles per River Mile	# Erosion Points per Trail Mile	# Erosion Points per River Mile
Chattooga Cliffs	6.1	1.9	3	0.4	0.375	0.6
Ellicott Rock	13.4	2.5	17	0.5	1.1	3.2
Rock Gorge	11.1	8.4	44	1.1	2.5	6.0
Nicholson Fields	4.4	6.5	27	1.7	2.1	7.1
Total	35	19.3	91	n/a	n/a	n/a

Sources: USDA 2007 and Whittaker and Shelby 2007

Table 3.1-6 displays the mileage of a subset of all existing trails that are in close proximity to the Chattooga River (USDA 2007). The first two columns show miles of designated and user-created trails within 100 feet of the river. The last two columns show the mileage of a subset of trails that are in very close proximity to the river (within 20 feet).

Table 3.1-6. Summary Of Trail Information For Existing Trails Within 20 And 100 Feet Of The Chattooga River (All Upper Chattooga Reaches).

Reach	Designated Trails Within 100 ft of River (mi)	User-created Trails Within 100 ft of River (mi)	Designated Trails Within 20 ft of River (ft)	User-created Trails Within 20 ft of River (ft)
Chattooga Cliffs	1.7	0.3	1,300	360
Ellicott Rock	2.6	1.2	1,580	1,033
Rock Gorge	3.8	2.4	3,536	2,901
Nicholson Fields	0.9	5.9	0	3,170
Total	9	9.8	6,416 ft (1.21 mi)	7,464 ft (1.41 mi)

Sources: USDA 2007, and Whittaker and Shelby 2007

For the upper Chattooga corridor, data from these tables indicate that the total distance of user-created trails within 20 feet of the Chattooga River is equal to or slightly greater than the total distance of designated trails (1.21 miles designated and 1.41 miles user-created). When the entire Chattooga corridor above Highway 28 is considered (including areas more than 20 feet from the river), there are 35 miles of designated trail and another 19 miles of user-created trails.

ENVIRONMENTAL CONSEQUENCES

Effects of the Alternatives on Water and the Riparian Corridor

Alternative 1 is considered the baseline for comparing direct, indirect and cumulative effects of the alternatives. Table 3.1-7 summarizes current plan direction for each of the three national forests for best management practices (BMPs).

Section 3.1.1 Water and Riparian Corridor

Table 3.1-7. Current Forest Plan Direction For BMPs.

	Georgia	South Carolina	North Carolina
BMPs	Standard FW-70: Implement current GA Rules and Regulations for Water Quality Control for all projects as a minimum to meet water quality objectives. Georgia's BMPs for forestry will be met or exceeded to meet water quality objectives for silviculture and related treatments.	Standard FW-1: Water quality, soil productivity, and channel structure are protected using BMPs to avoid impacts to water quality and soils. Where riparian prescription direction differs from BMP, the more restrictive or protective prescription will be followed. Standard FW-2: Where BMPs are not specifically designed for activities, apply similar preventive measures as published in forestry BMPs to avoid, minimize or mitigate effects to water quality, streamside management zones and soils.	FW Standard (soil & water): Prevent visible sediment from reaching perennial and intermittent stream channels and perennial water bodies in accordance with NC Forest Practice Guidelines Related to Water Quality (NC PGRWQ)

Source: USDA 2004a, USDA 2004b, USDA 1994.

On all three national forests, riparian resources are managed to maintain a diversity of ecological and social benefits, including both dispersed and developed recreation opportunities. Although these activities can have potential impacts to riparian corridors, they are allowed because the majority of forest users prefer to recreate in or near bodies of water. Current recreation areas and facilities are maintained to minimize impacts to water quality, shorelines and streambanks. Roads, trails and other activities in the riparian corridor that are causing undesirable resource impacts are identified for appropriate mitigation measures, including possible closure (USDA 2004a, USDA 2004b, USDA 2004c, USDA 1994).

The cumulative effects analysis assumes that baseline conditions in the Chattooga watershed are generally good, but some stream segments are impaired due to excessive sedimentation from a combination of past and existing activities and the associated legacy/stored sediment and existing sediment sources such as unpaved roads. Streams draining private lands generally show a higher level of impairment and would remain that way into the foreseeable future.

Future activities can contribute to these effects or alleviate some of the problems. Foreseeable future activities on private lands are assumed to be similar to those currently taking place in the watershed. Anticipated development and growth in the mountains is expected to result in increased impervious surfaces. Agricultural practices are assumed to continue at a similar pace and will likely result in little change in riparian conditions on private lands within the foreseeable future. On NFS lands, the reasonably foreseeable future actions include continued road maintenance/use, trail maintenance/use, and developed and dispersed recreation. Table 3.1-8 summarizes existing land cover/use in the Chattooga River watershed for NFS and private lands, based on data from the Multi-Resolution Land Cover (MRLC) Data project.

Section 3.1.1 Water and Riparian Corridor

Table 3.1-8. Summary Of Existing Acres Of Land Cover By Uses Within The Chattooga River Watershed.

Land Cover	National Forest	Private	Total
Barren Land	131	83	214
Cultivated Crops	28	227	255
Deciduous Forest	82,791	27,944	110,735
Developed, High Intensity		50	50
Developed, Low Intensity	15	561	576
Developed, Medium Intensity		198	198
Developed, Open Space	2,369	6,324	8,693
Evergreen Forest	28,005	5,113	33,118
Hay/Pasture	484	5,434	5,918
Herbaceous	349	1,034	1,384
Mixed Forest	11,892	3,697	15,589
Open Water	62	422	484
Shrub/Scrub	585	696	1,280
Woody Wetlands	131	127	258

Source: MRLC data, 2001. Acres approximate

Past, Present and Reasonably Foreseeable Future Actions

Table 3.1-9 displays known past, present and reasonably foreseeable future actions on NFS lands within the Chattooga watershed that may contribute cumulatively to the direct and indirect effects of proposed activities within the Chattooga River corridor. More information about the activities listed below is available from each district. Beginning year is 2002.